

Addressing uncertainty in fisheries management through participatory modelling

Röckmann, Christine; Hauge, Kjelrun Hiis; Ulrich, Clara; Bell, Ewen; Tserpes, George; Haapasaaari, Päivi ; Mäntyniemi, Samu; Dreyer, Marion; Howell, Daniel; Borodzicz, Edward

Total number of authors:
11

Publication date:
2011

Document Version
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

Citation (APA):
Röckmann, C., Hauge, K. H., Ulrich, C., Bell, E., Tserpes, G., Haapasaaari, P., Mäntyniemi, S., Dreyer, M., Howell, D., Borodzicz, E., & Pastoors, M. (2011). *Addressing uncertainty in fisheries management through participatory modelling*.
<https://www.surfgroepen.nl/sites/jakfish/Presentations/JAKFISH%2020110324%20Rockmann%202011%20%C3%96stersund%20RiskUncertaintyPolicyConference.pdf>

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.



Addressing uncertainty in fisheries management through participatory modelling

Christine Röckmann (presenter)

Kjellrun Hiis Hauge, Clara Ulrich, Ewen Bell, George Tserpes,
Päivi Haapasaari, Samu Mäntyniemi, Marion Dreyer, Daniel
Howell, Edward Borodzicz, Martin Pastoors



Östersund, March 2011

Judgement And Knowledge in Fisheries Involving Stakeholders



– the interdisciplinary project team –



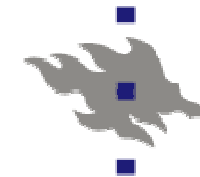
INNOVATIVE FISHERIES MANAGEMENT
- an Aalborg University Research Centre

DTU Aqua

National Institute of Aquatic Resources



INSTITUTE OF MARINE RESEARCH
HAVFORSKNINGSINSTITUTTET



UNIVERSITY OF HELSINKI



University of
Portsmouth



Outline

1. **“problem diagnosis”**

Brief background on fisheries management in Europe

2. **"JAKFISH exploratory approach"**

idea and intention of the JAKFISH project

3. **"insights gained"**

Conclusions from participatory modelling



Fisheries management in the EU

European Commission
Fisheries

FAQ | Links | Site map | Search on EUROPA | About this site | Contact | Legal notice | English (en)

European Commission > Fisheries > CFP

Maritime Affairs

Fisheries

Atlas

Forum

Share

Fisheries

Home

About us

News and events

Contracts and funding

Documentation

Our partners

The common fisheries policy

► Reform of the Common Fisheries Policy

► Simplification

► Illegal fishing (IUU)

► Fishing rules

► The European fisheries fund

► Aquaculture

► International

► Market

► Fisheries controls

► Fisheries research

State aid

Sea basins

Marine environment

Fish and shellfish

The common fisheries policy (CFP)

Management of fisheries in the EU

Fish move across borders and seas, and fishing fleets have done the same for centuries. As the activities of each fishing fleet affect the opportunities of other fleets, the EU countries have decided to manage their fisheries in collaboration, through the common fisheries policy (CFP). This policy brings together a range of measures designed to achieve a thriving and sustainable European fishing industry.

Fishermen in Ireland. © Lionel Flageul

The most important areas of action of the common fisheries policy are:

- laying down rules to ensure Europe's fisheries are **sustainable** and do not damage the marine environment (see [fishing rules](#))
- providing national authorities with the tools to **enforce** these rules and punish offenders (see [fisheries controls](#))
- monitoring the **size of the European fishing fleet** and preventing it from expanding further (see [fishing fleet](#))
- providing **funding and technical support** for initiatives that can make the

Search

Free text

by keywords

[reform](#)

[control](#)

[illegal fishing](#)

[more keywords](#)

Related content

[Basic regulation on the common fisheries policy \(CFP\)](#)

[Regulation governing financial interventions under the CFP](#)

[Fisheries legislation \(EUR-Lex\)](#)

Summaries of EU legislation:

- [All topics related to EU fisheries policy](#)
- [The basic regulation on the common fisheries policy](#)
- [Rights-based management tools in fisheries](#)

[Facts and figures on the CFP](#) [5 MB]

News

Internet

Uncertainties in fisheries

- You cannot easily count fish (neither alive nor dead)
- What is a sustainable fishery?
- How to prioritise different objectives – ecological, but also economic and social?
- Given high uncertainties and high stakes, what risk (e.g. of stock collapse) is society willing to take?
- Does the scientific method fit the policy problem?
- What are the scientific assumptions, and do they potentially favour certain values at stake?

➔ CONFLICTS

Conflicts and problem diagnosis

- Mistrust due to differing perceptions between scientists and fishers of how many fish there are in the sea
- Illegal fishing, black landings

- ➔ **Inefficiency of policies and management measures**
- ➔ **lack of legitimacy of management decisions and underlying policies**

Driver and idea

Policy driver:
Reform of the CFP



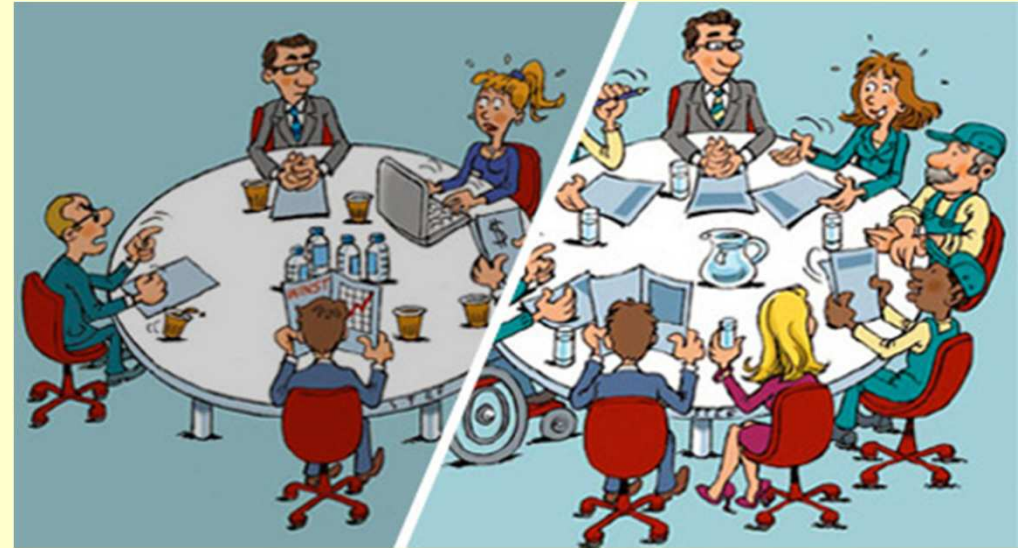
➔ Improve the quality of management decisions through **PARTICIPATION** ➔ involving stakeholders

- ✓ **openness and transparency (wrt uncertainty, model assumptions, ...)**
- ✓ **including stakeholders' knowledge and interests to improve the knowledge base**

➔ basis for building up **trust, support, ownership, legitimacy**

exploratory approach


- ➔ Participatory modelling
- emerging field



Start/ Basis:

- Review of participatory methods
- Findings of participatory approaches in river-basin and forest management
- Simulation (role play) development to confront stakeholders with each others' realities

Stakeholders

 **Regional Advisory Councils (RACs):**
stakeholder-led organisations: representatives of the fisheries sector and other interest groups (e.g. NGOs)

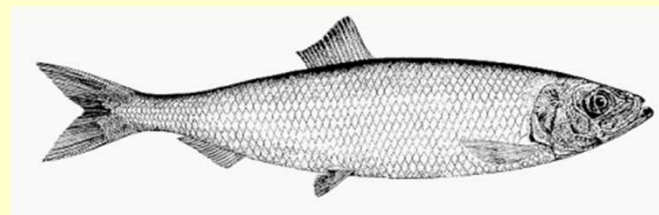
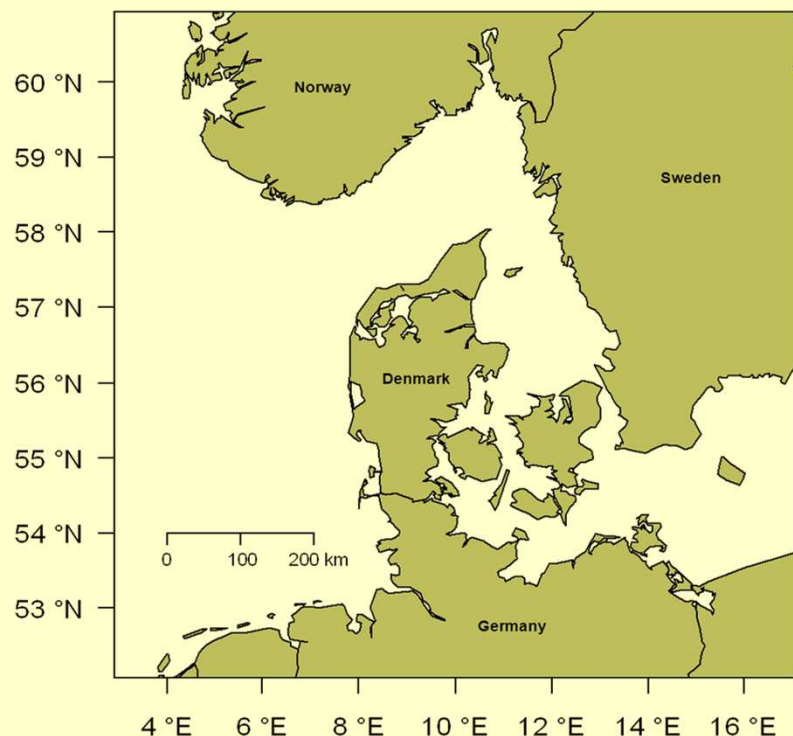
Stakeholder input at various stages:

- Problem framing
- Scenario development
- Evaluation / Commenting on
 - data used
 - Ecosystem interactions
 - Uncertainties, Risks
 - Scenarios
 - Results



One case study approach

- **Western Baltic Spring Spawning herring**



Clara Ulrich, A. Coers, K.H. Hauge, L.W. Clausen, C. Olesen, L. Fisher, R. Johansson, M.R. Payne



SMALL STOCK, BIG PROBLEMS!

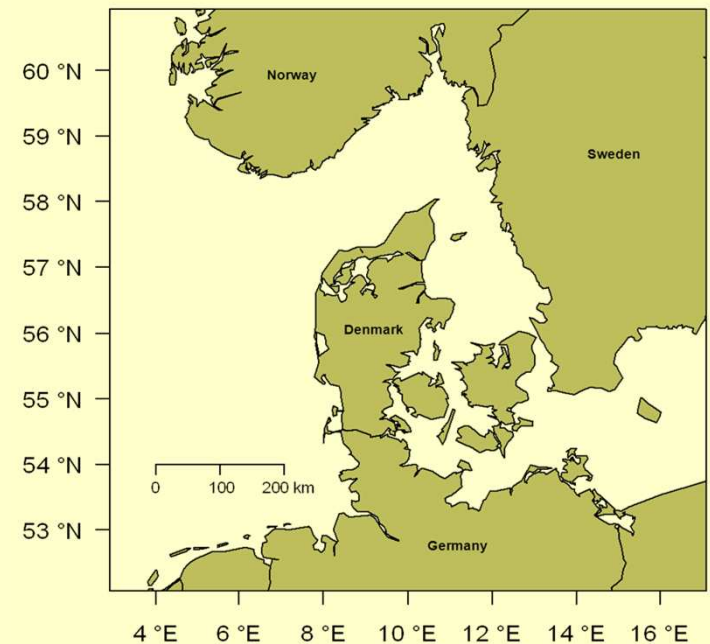


Biological and stock assessment issues

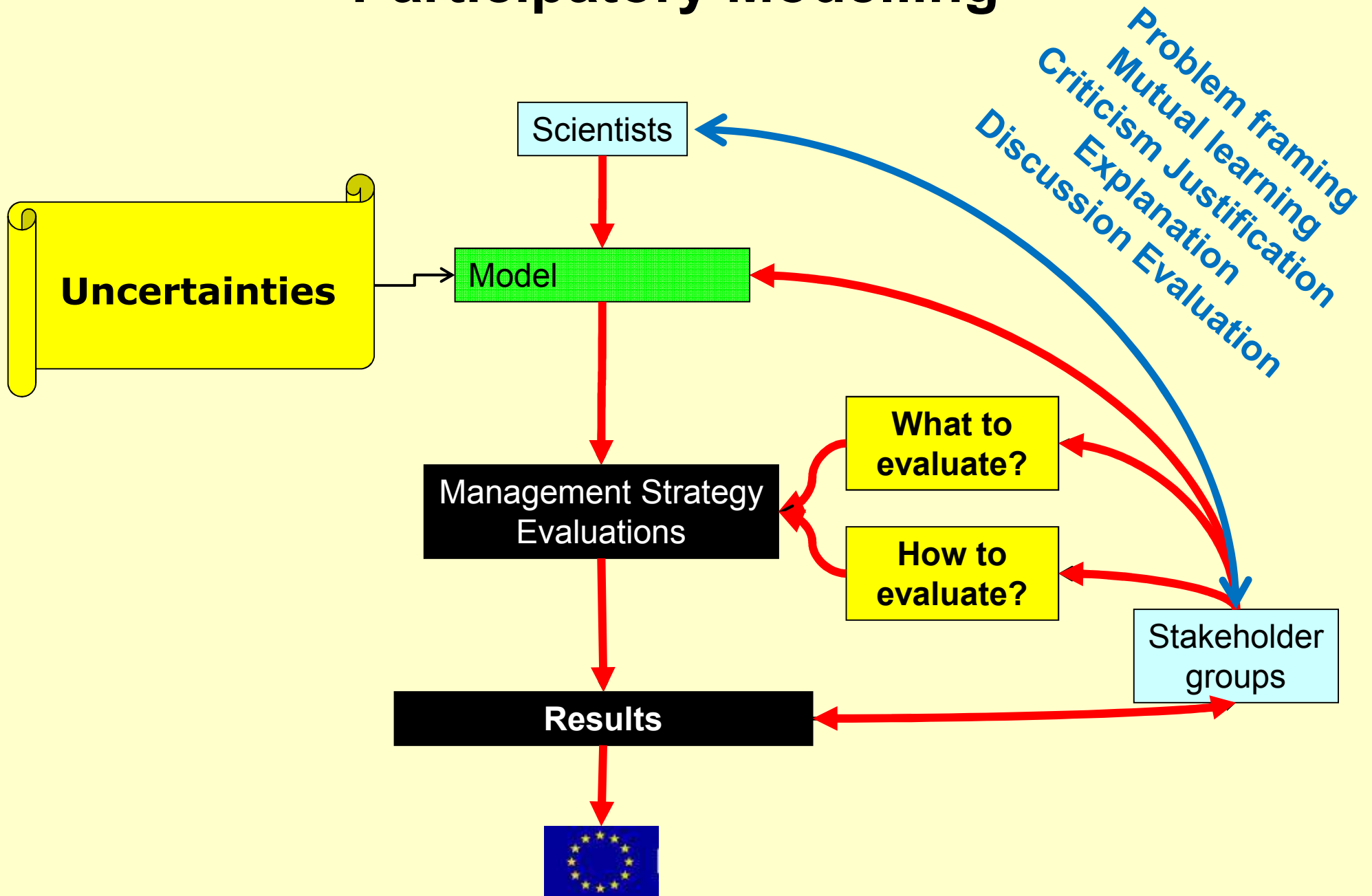
- Lack of biological knowledge
- Model uncertainties
- Scientific advice contested by stakeholders

Political issues

- 4 countries,
- 4 fleets,
- 2 Regional Advisory Councils
- EC initiative: proposal for the establishment of a long term management plan

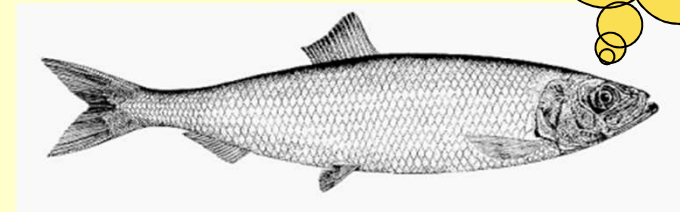


Participatory Modelling



Case study lessons learned

- Disagreement with a previous scientific suggestions for a management approach
- Agreement on a new solution, facilitated through the JAKFISH's participatory work
- Still unresolved issues and differences in interpretation
- Have we improved the year-to year management?
- The science base is
 - ✓ Communicated
 - ✓ Understood
 - ✓ Accepted (~)
- The result
 - ✓ Agreed
 - ✓ Supported



We are on
the right
track!

Commonalities between case studies

- Unsustainable fisheries
 - High uncertainties
 - Conflicts due to scarce resources, different interpretation about the resource situation
 - Potential to benefit from scientific modelling to explore management options
-
- ➔ JAKFISH helped stakeholders develop and evaluate management options
 - ➔ assessment of epistemic uncertainties
 - ➔ stakeholder evaluation of process and outcome

Differences between case studies

- The target fish species



- The purpose of the participatory modelling

- Pragmatic – Problem framing and solving: jointly achieving an acceptable result (LTMP)
- Theoretical – Improving the knowledge base

- The starting point

- Established stakeholder groups, plan in preparation, partly consensus
- Starting from scratch

- The process

- Deliberation, mutual reflection, argumentative exchange
- Analysis, focus on scientific approach

Lessons learnt

Less promising:

- Questionnaires, interview surveys to collect feedback
- Teaching/ informing stakeholders as THE objective

Promising :

- Face to face interviews, meetings
- Teaching/ informing built into the process as a means to achieve a better outcome
- Feeling of continuation, long term engagement
- Some starting consensus between parties
- Make sure to include ALL relevant parties and topics, be aware of official institutional processes
- Participatory modelling takes **time** – and it is worth it
JAKFISH budget ensured long-term ‘availability’, but ends soon. What next?

Conclusions

- Participatory modelling is one approach to increase transparency, mutual learning, understanding of uncertainties and risks, building of mutual trust, goodwill, support and ownership
 - ➔ can improve quality of knowledge base and management decisions in the face of uncertainty ➔ increases legitimacy
- Participatory modelling in JAKFISH has set a step forward on the learning curve, next to other approaches.

Where people communicate with each other, it improves people's ability to understand each other!



Thank you!

Questions? Comments?

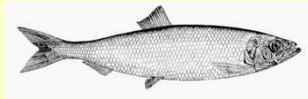
Christine Röckmann (presenter)

Kjellrun Hiis Hauge, Clara Ulrich, Ewen Bell, George Tserpes, Päivi Haapasaari, Samu Mäntyniemi, Marion Dreyer, Daniel Howell, Edward Borodzicz, Martin Pastoors



Östersund, March 2011

Differences between case studies



➤ **WBSS Herring and Mediterranean Swordfish fisheries Multi-annual management plan in preparation**

- Established stakeholder group, pragmatic approach, focused



North Sea Nephrops fishery

Management plan preparation - starting from scratch

- Identifying stakeholders, problem framing; unfocused; lack of mutual understanding

➤ Central Baltic Herring fishery

Incorporating stakeholder knowledge into modelling

- Mainly scientific approach: pooling stakeholder info, weighing different views, scoping for systemic uncertainties and risk probabilities

Multi-annual management plan in preparation

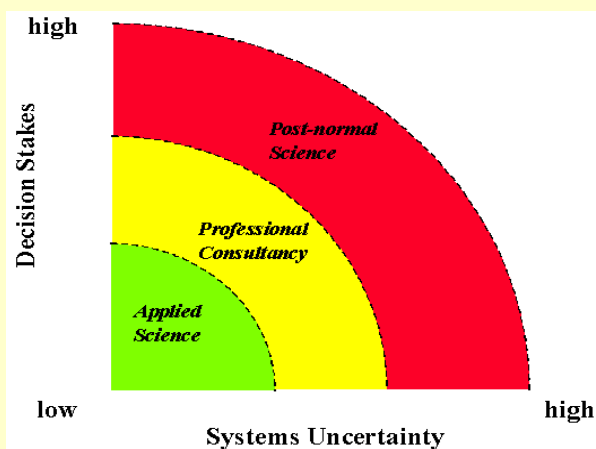
(a) WBSS Herring and Mediterranean Swordfish fisheries

- already established stakeholder groups;
- started with partial consensus (between stakeholders themselves and between stakeholders and scientists)
- identification of key sources of scientific uncertainty through pedigree matrices → pragmatic approach

Pedigree Matrices (Funtowicz and Ravetz 1990)

Goal :
addressing non-quantifiable uncertainty

	Stock - recruitment	Growth	Natural mortality (M)	State of stock (input in LTMP simulations)	Impact of climate change
4	Clear visual and functional relationship	Well sampled and causes of fluctuations are well understood	Reliable estimates of M	High quality assessment with uncertainty estimates	Well understood consequences of experienced temperature fluctuations
3	Possible relationship	Well sampled, but causes of fluctuations poorly understood	Reliable estimates of M, but not at early life stages	High quality assessment, but limited focus on uncertainty estimates	Known impact on growth or recruitment or distribution
2	No clear relationship, recent average used	Poor sampling, and environmental effects on growth poorly understood	Poor estimates of M.	Rather low quality assessment	Limited knowledge, and not accounted for in modelling
1	Unknown	Unknown	Unknown predation by cod and other top predators of the ecosystem	Inadequate data and knowledge in assessment	No knowledge of temperature effects on stock



Management plan preparation - starting from scratch

b) Nephrops (Norway lobster) fishery

- No initial consensus on the problem and how JAKFISH could help.
- Stakeholders organised port meetings, “to set out clear objectives and a range of management options” → aiming at a plan that has industry “buy in”
- Scientists focused on technical modelling challenges; mapping out uncertainties
- Lack of mutual understanding; different perceptions about progress
- approach was preparatory; next step could be as under (a: WBSSH)

Incorporating stakeholder knowledge into modelling

c) Central Baltic Herring fishery

- Scientific approach (Mental modelling, influence diagram, Bayesian model averaging): pooling stakeholder info, weighing different views.
- Scoping for systemic uncertainties, and uncertainties related to probability sides of risk
 - graphical “risk register”: to show actions, uncertainties and valuation of consequences